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EXAMINER

NGO, NGUYEN HOANG

ART UNIT PAPER NUMBER

2663

DATE MAILED: 02/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/940,758

Applicant(s)

CALVIGNAC ET AL.

Examiner

Nguyen Ngo

Art Unit

2663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on December 1, 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-29 and 35-39 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 12 and 30-33 is/are rejected.
- 7) ☒ Claim(s) 3-11, 13, 14 and 34 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

This communication is in response to the amendment of December 1 2005.

Accordingly, Claims 1-39 are currently pending in the application.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 12, 30, and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Uzun (US 6606681), hereinafter referred to as Uzun.

Regarding claim 1, Uzun discloses a method for realizing a content addressable memory including an associative memory and a random access memory portion/status memory (method for identifying a data structure (data structure in status memory) associated with a packet of data, col2 lines 20-25). Uzun further discloses;

receiving packets and that the address for each packet is extracted from the packet header and provided as a search key (receiving a packet of data and extracting one or more fields from a packet header of said packet of data to generate a search key, col4 lines 59-64).

that the key is provided as a search string to a CAM (col4 lines 60-61) and that the CAM includes a plurality of entries, each including a valid bit and a key (selecting a table (CAM) to be accessed using said search key, figure 1A and col1 lines 50-53).

of a packet processing engine that forwards the extracted address information in the form of a search string to CAM control logic (identifying said data structure associated with said packet (as explained below) of data using a content addressable memory, col5 lines 35-37). It should be noted that claim 1 states, determining the data structure using either a CAM or a tree based on a table definition of said selected table. Examiner thus correlates the use of the search string within the CAM to correlate with determining to identify said data structure using a content addressable memory.

of a status memory that includes information status bits associated with the keys in the CAM and that each address location in the CAM has a direct relationship with the data stored in the status memory and that the data structure for an entry stored in status memory is four binary bits (identifying said data structure associated with said packet of data (correlating to data structure for an entry in the status memory associated with address location and key which is associated with said packet) in response to said determination step, col6 lines 49-65).

Regarding claim 2, Uzun discloses that the CAM includes a plurality of entries, each including a valid bit and a key, and that associated with each entry in the CAM, is an address for a given entry. Of an external search engine (tree search engine) that provides keys to be searched for in the information space associated with the CAM

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(transferring search key to a tree search engine) and that the address of a matching keys is obtained upon detection of a match (associating search key with a particular thread number/table number pair, figure 1A and col1 lines 49-63).

Regarding claim 12, Uzun discloses that the data structure for an entry stored in status memory is four binary bits and that forwarding decisions for the packet are determined based on the values (performing a particular action (forwarding decision) on said packet of data based on said data identified, structure col6 lines 56-65).

Regarding claim 30, Uzun discloses a method for realizing a content addressable memory including an associative memory and a random access memory portion/status memory (method for identifying a data structure (data structure in status memory) associated with a packet of data, col2 lines 20-25). Uzun further discloses;

receiving packets and that the address for each packet is extracted from the packet header and provided as a search key (receiving a packet of data and extracting one or more fields from a packet header of said packet of data to generate a search key, col4 lines 59-64).

of an external search engine (tree search engine) that provides keys to be searched for in the information space associated with the CAM and that the address of a matching keys is obtained upon detection of a match (transferring said search key to a

CAM by a tree search engine configured to identify said data structure associated, figure 1A and col1 lines 49-63).

that the key is provided as a search string to a CAM (col4 lines 60-61) and that the CAM includes a plurality of entries, each including a valid bit and a key (identifying a particular entry number in said CAM based on said search key, figure 1A and col1 lines 50-53).

of a packet processing engine that forwards the extracted address information in the form of a search string to CAM control logic (identifying said data structure associated with said packet (as explained below) of data using a content addressable memory, col5 lines 35-37).

of a status memory that includes information status bits associated with the keys in the CAM and that each address location in the CAM has a direct relationship with the data stored in the status memory and that the data structure for an entry stored in status memory is four binary bits (identifying said data structure associated with said packet of data (correlating to data structure for an entry in the status memory associated with address location and key which is associated with said packet), col6 lines 49-65).

Regarding claim 31, Uzun discloses that CAM includes a search routine, which compares the search string to the CAM's key entries, and returns an address (entry number) for a matching entry as an output (col6 lines 34-39).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzun (US 6606681), in view of Hunter et al. (US 6343289), hereinafter referred to as Uzun and Hunter.

Regarding claim 32, Uzun fails to disclose the specific limitations of claim 32. Uzun does however disclose of a search routine which is invoked upon receipt of a search string (col6 lines 34-40) and further describes if there is no match found in CAM, of inserting a new entry (col10 lines 39-43), thus providing the motivation to incorporate a search routine implementing procedures to efficiently determine when there is no match in the CAM.

Hunter however discloses of a null pointer if the entry happens to be the last on in the bin (col1 lines47-49) and further discloses that if the last bin has bin reached (search in said CAM using said search key), then no matching entry exists and the search is complete (search key does not match a particular entry in said CAM then said CAM returns a null pointer and determining whether said search is complete, col9 lines 7-12).

It would this been obvious to a person skilled in the art to associate the concept of a null pointer disclosed by Hunter into the method of realizing a content addressable memory including an associative memory and a random access memory portion/status memory as disclosed by Uzun to provide a detection and efficient means of when the key search is complete and whether a match is found in the CAM (non-null value meaning a match and null value meaning no match).

Regarding claim 33, the combination of Uzun and Hunter discloses all the limitations of claim 33 as discussed with claim 32.

Allowable Subject Matter

7. Claims 15-29, and 35-39 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

8. Claims 15 and 35 is are allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose **having said**

content addressable memory coupled to said tree search engine via an interface unit, wherein said content addressable memory stores a plurality of entries, wherein each of said plurality of entries has an entry number associated with it; and wherein said tree search engine comprises circuitry for identifying said data structure associated with said packet of data. It is noted that the closest prior art,

Uzun (US 6606681) discloses the method for realizing a CAM including an associative memory and a random access memory/status memory. However, Uzun fails to disclose or render obvious to the above underline limitations as claimed.

9. Claims 3-11, 13, 14, and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10. Applicant's arguments see Remarks page 2-20, filed 12/1/2005, with respect to the rejection(s) of claim(s) 1-3, 12, and 30-34 under Chandrasekaran (US 6862281) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Uzun (US 6606681).

Conclusion

11 The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) Damron (US 6687807), Method For Apparatus For Prefetching Linked Data Structures.

b) Kumar et al. (US 5898689), Packet Network Interface.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nguyen Ngo whose telephone number is (571) 272-8398. The examiner can normally be reached on Monday-Friday 7am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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